ISSN (print) 0093-4666 © 2011. Mycotaxon, Ltd. ISSN (online) 2154-8889

MYCOTAXON

Volume 116, pp. 21–25 *April–June 2011*

DOI: 10.5248/116.21

Three corticolous species of *Lecanora* (*Lecanoraceae*) new to China

Liu-Fu Han[1] Shou-Yu Guo[2*] & Hao Zhang[3]

[1]*College of Life Science, Hebei Normal University, Shijiazhuang 050016, P. R. China*
[2]*Key Laboratory of Systematic Mycology and Lichenology, Institute of Microbiology, Chinese Academy of Sciences, Beijing 100101, P. R. China*
[3]*Department of Biology Science, Handan College, Handan 056005, P. R. China*
Correspondence to *: *hanliufu@163.com, *guosy@im.ac.cn, & zhanghao_55@163.com*

Abstract —Three corticolous species of the lichen genus *Lecanora*— *L. mikuraensis, L. queenslandica,* and *L. thysanophora* — are reported from China for the first time. General data on habitats, diagnostic characters, geographic distribution, and habit and anatomical photos of the newly recorded species are provided.

Key words —lichenised ascomycetes, Anhui, Hebei, Shaanxi, taxonomy

Introduction

The lichen genus *Lecanora* Ach. (*Lecanoramycetes*, *Ascomycota*) consists of some 550 species worldwide (Kirk et al. 2008). It is characterized by *Lecanora*-type asci, simple ascospores, and crustose thalli. The apothecial margin usually contains algal cells. The taxa of *Lecanora* grow on a wide variety of substrata, such as rocks, soil, bark or wood. In China, Wei (1991) cited 63 species, 11 varieties, and 5 forms, after which an additional 43 species (including 1 new) were reported (Cao et al. 1995, Abbas et al. 1998, Aptroot & Seaward 1999, Aptroot & Sparrius 2003, Mamut et al. 2004, 2009, Wang et al. 2007, Han et al. 2009, Lü et al. 2008, 2009a,b,c), bringing to 106 the number of taxa reported from China.

During our study of *Lecanora,* we discovered three corticolous species new to China: *L. mikuraensis*, *L. queenslandica* and *L. thysanophora,* for which we provide general data on habitats, diagnostic characters, geographic distribution, brief comments, and habit and anatomical photos.

Materials & methods

The present paper is based on the collections from Sectio Lichenum, Herbarium Mycologici Academiae Sinicae (HMAS-L) and the Lichen Section of Botanical

Herbarium, Hebei Normal University (HBNU). Apothecia were observed in free-hand sections mounted in water. Sections through apothecium were stained by 0.2% Toluidine blue about 30 min before adding 10% KOH. All specimens were examined and measured under the dissecting (Motic SMZ-140) and compound (Olympus CH) microscopes. Apothecial crystals were examined using polarized light under microscope (Motic PM18). Secondary metabolites were identified using thin layer chromatography (TLC) (Culberson 1972).

New records from China

Lecanora mikuraensis Miyaw., J. Hatt. Bot. Lab. 64: 296. 1988. Fig. 1a,d

Specimen examined: **China. Hebei,** Mt. Xiaowutai, on bark, 2008/VII/1, Zhang Hao 20080147 (HBNU).

Thallus crustose, thin to thick, areolate, verrucose to granular, gray, esorediate, epruinose. Prothallus absent. Apothecia lecanorine, abundant, single to crowded, adnate to constricted at the base, 0.4–1.6 mm in diam., disc yellowish brown, plane to slightly convex, epruinose; margins prominent, verruculose, concolorous with thallus. Amphithecium: cortex thin, or indistinct, algal dispersed, containing large crystals and small. Epihymenium not pigmented, with coarse yellowish crystals soluble in KOH, 13–18 μm tall. Hymenium hyaline, 50–60 μm tall. Hypothecium hyaline, 75–100 μm tall. Paraphyses simple, not thickened or slightly thickened apically. Asci clavate, 8-spored. Ascospores ellipsoid, simple, 7.5–12.5 × 4.0–6.0 μm. Pycnidia not seen.

Chemistry: K+ yellow; atranorin (TLC).

Comments: *Lecanora mikuraensis* is readily identified by its non-pigmented epihymenium with coarse yellowish crystals. It is closely related to *L. insignis* and *L. cinereofusca* but differs in lacking "beaded" apothecial margins, pannarin, and dark brown discs. The species also superficially resembles *L. chlarotera* and *L. leprosa* but lacks gangaleoidin and a pigmented epihymenium.

Lecanora mikuraensis is known previously only from Japan (Miyawaki 1988).

Lecanora queenslandica C. Knight, Syn. Queensland Fl. 2, Suppl.: 85. 1888. Fig. 1b,e

Specimens examined: **China. Shaanxi**, Mt. Taibai, alt. 3189 m, 2005/VIII/4, Huang Man-rong 2590 (HMAS-L 070630); alt. 2915 m, 2005/VIII/4, Huang Man-rong 2798 (HMAS-L 070584), Huang Man-rong 2799 (HMAS-L 070585), Huang Man-rong 2598 (HMAS-L 070586), Huang Man-rong 2800 (HMAS-L 070587), Huang Man-rong 2795 (HMAS-L 070592); alt. 2896 m, 2005/VIII/4, Huang Man-rong 2491 (HMAS-L 070591); alt. 2930 m, 2005/VIII/4, Huang Man-rong 988 (HMAS-L 070652); Ningshan County, alt. 2100 m, 2005/VII/28, Huang Man-rong 545 (HMAS-L 070571).

Thallus crustose, coarse, slightly verrucose, pale gray to gray, esorediate, epruinose. Prothallus absent. Apothecia abundant, lecanorine, sessile to constricted at base, almost single, 0.5–1.4(–2.0) mm in diam.; discs orange-

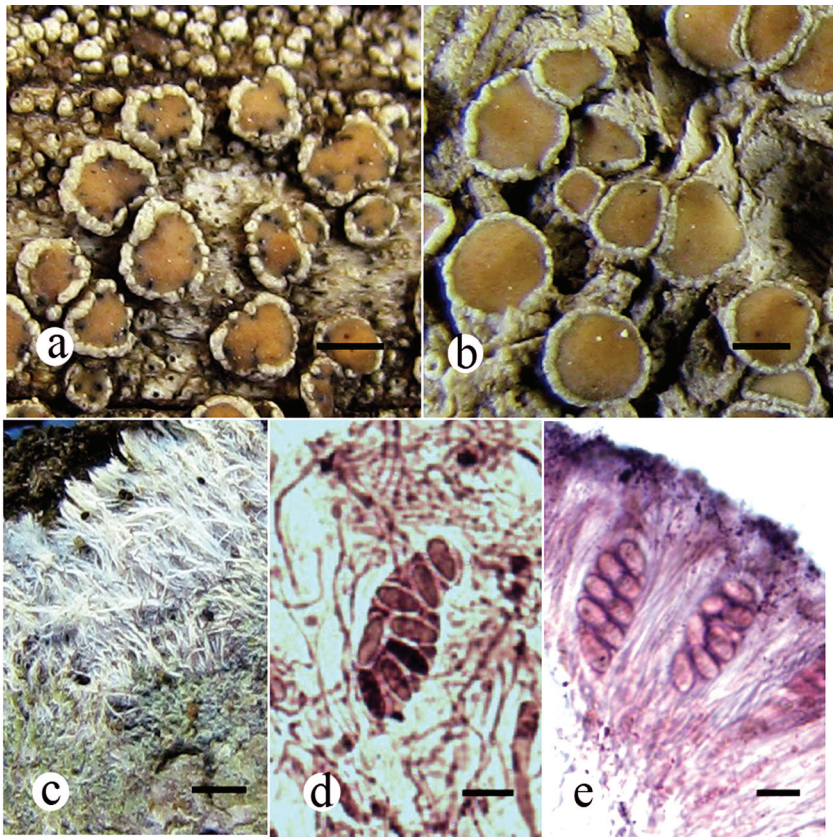

Fig. 1. *Lecanora* species new to China. Habit (a–c; scales = 1 mm): a. *L. mikuraensis* (Zhang Hao 20080147, HBNU); b. *L. queenslandica* (Huang Man-rong 2800, HMAS-L 070587); c. *L. thysanophora* (Han Liu-fu 0810042-4, HBNU). Asci (d–e; scales = 10 μm): d. *L. mikuraensis*; e. *L. queenslandica*.

brown, epruinose or slightly pruinose, plane; margins smooth, entire, sometimes slightly crenulate or verruculose, concolorous with thallus. Amphithecium: cortex indistinct with algal layer, cortex 25–37 μm laterally, 30–40 μm basally; algal layer 100–125 μm laterally, 100–150 μm basally, containing large crystals insoluble in KOH. Epihymenium with small crystals soluble in KOH, pale orange brown, 13–20 μm tall. Hymenium hyaline, 50–65 μm tall. Hypothecium hyaline, 75–100 μm tall. Paraphyses not thickened or slightly thickened apically. Asci clavate, 8-spored. Ascospores ellipsoid to broadly ellipsoid, simple, 9.0–12.5 × 6.0–8.0 μm.

Chemistry: K+ yellow, C–; atranorin, usnic acid, psoromic acid.

Comments: *Lecanora queenslandica* is readily distinguished from other *Lecanora* species by the presence of usnic and psoromic acid in the thallus, the orange brown apothecial discs, and the crystalloid epihymenium. Closely related to *L. chlarotera*, it differs in the short ascospores, possession of usnic and psoromic acids, and absence of gangaleoidin.

Lecanora queenslandica is known previously only from Australia (Lumbsch 1994, 2004).

Lecanora thysanophora R.C. Harris, The Bryologist 103: 790. 2000. Fig. 1c

Specimens examined: **China. Anhui**, Jinzhai County, alt. 1450 m, 2008/X/12, Han Liu-fu & Zhao Hao 0810006 (HBNU); alt. 1350 m, 2008/X/11, Han Liu-fu 0810042-2 (HBNU).

Thallus a thin patchy layer of granular soredia, almost leprose, pale green to yellowish green on surface and with white, conspicuous, webby or fibrous prothallus developing at the margin. Apothecia not seen.

Chemistry: Thallus K+ yellow; containing atranorin, usnic acid, and an unidentified substance (TLC).

Comments: This species is readily distinguished from other *Lecanora* species by the powdery thallus with the white fibrous margins, presence of usnic acid and atranorin. *Lecanora thysanophora* closely resembles other *Lepraria* species (particularly *L. impudens*), but differs in its powdery thallus with the fibrous margins.

Brodo (2001) described *L. thysanophora* from North America, and it is also recorded from Europe (e.g. Kowalewska et al. 2003, Mrak et al. 2004, Tønsberg 1999, Tønsberg et al. 2001).

Acknowledgements

The project was supported by the Chinese Academy of Sciences (KSCX2-YW-Z-041), the National Natural Science Foundation of China (No. 30770012), the Natural Science Foundation of Hebei Province (No. C2008000178) and Doctoral Fund of Hebei Normal University (L2009B11). The authors would like to thank Prof. Wei Jiang-Chun (Institute of Microbiology, CAS) for guidance and Ms. Deng Hong (HMAS-L) for assistance during this study. The authors would like to express their deep thanks to Dr. André Aptroot (ABL Herbarium, The Netherlands) and Dr. Huang Man-Rong (Beijing Museum of Natural History, China) for reading the manuscript and serving as pre-submission reviewers.

Literature cited

Abbas A, Wu JN. 1998. Lichens of Xinjiang. Sci-Tech & Hygiene Publishing House of Xinjiang, Urumqi. 178 pp.

Aptroot A, Seaward MRD. 1999. Annotated checklist of Hong Kong lichens. Tropical Bryology 17: 57–101.

Aptroot A, Sparrius LB. 2003. New microlichens from Taiwan. Fungal Diversity 14: 1–50.

Brodo IM, Sharnoff SD, Sharnoff S. 2001. Lichens of North America. Yale University Press, New Haven and London. 795pp.

Cao R, Yong SP, Ma YQ. 1995. Preliminary study of lichens in semi-dry mountains region in NeiMonggol. Acta Scientiarum Naturalium Universitatis NeiMonggol 26: 587–595.

Culberson CF. 1972. Improved conditions and new data for the identification of lichen products by a standardized thin-layer chromatographic method. Journal of Chromatography 72: 113–125. doi:10.1016/0021-9673(72)80013-X

Han LF, Zhao JC & Guo SY. 2009. *Lecanora weii*, a new multispored species of *Lecanora* s. str. from northeastern China. Mycotaxon 107: 157–161. doi:10.5248/107.157

Kirk PM, Cannon PF, Minter DW, Stalpers JA (eds.). 2008. Ainsworth & Bisby's dictionary of the fungi, tenth edition. CABI International, Wallingford. 771 pp.

Kowalewska A, Kukwa M. 2003. Additions to the Polish lichen flora. Graphis Scripta 14: 11–17.

Lü L, Wang CL, Ren Q, Shi XL, Zhao ZT. 2008. The lichen genus *Lecanora* from Bailong river valley of Gansu province, China. Mycosystema 27(1): 99–104.

Lü L, Ren Q, Wang HY, Zhao ZT. 2009a. New records of four *Lecanora* species from China. Mycotaxon 110: 437–441. doi:10.5248/110.437

Lü L, Ren Q, Sun LY, Yang F, Zhao ZT. 2009b. Three species of the lichen genus *Lecanora* new to China from Bailong River Valley, Gansu Province. Guihaia 29 (3): 311–313.

Lü L, Wang HY, Zhao ZT. 2009c. Five lichens of the genus *Lecanora* new to China. Mycotaxon 107: 391–396. doi:10.5248/107.391

Lumbsch HT. 1994. Die *Lecanora subfusca* Gruppe in Australasien. Journal of the Hattori Botanical Laboratory 77: 1–175.

Lumbsch HT, Elix JA. *Lecanora*. 12–62, in: McCarthy PM, Mallett K (eds.). 2004. Flora of Australia, volume 56A, lichens 4. ABRS, CSIRO Australia, Melbourne.

Mamut R, Keyimu A, Abbas A. 2004. New Chinese records of the lichen genus *Lecanora* Ach. collected from Khanas Nature Reserve of Xinjiang. Mycosystema 23(1): 167–168.

Mamut R, Tumur A, Xahidin H, Abbas A. 2009. A species of *Lecanora* new to China. Mycosystema 28(1): 154–156.

Miyawaki H. 1988. Studies on the *Lecanora subfusca* group in Japan. Journal of the Hattori Botanical Laboratory 64: 271–326.

Mrak T, Mayrhofer H, Batic F. 2004. Contributions to the lichen flora of Slovenia XI. Lichens from the vicinity of Lake Bohinj (Julian Alps). Herzogia 17: 107–127.

Tønsberg T. 1999. Lichenes isidiosi et sorediosi crustacei exsiccati. Fascicle 2 (Nos 26–50). University of Bergen, Bergen. 10 pp.

Tønsberg T, Türk R, Hofmann P. 2001. Notes on the lichen flora of Tyrol (Austria). Nova Hedwigia 72(3–4): 487–497.

Wang CL, Sun LY, Ren Q, Zhao ZT. 2007. A preliminary study of multispored *Lecanora* Ach. from Mt. Taibai. Mycosystema 26(1): 46–50.

Wei JC. 1991. An enumeration of lichens in China. International Academic Publishers: Beijing. 278 pp.